Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

TITLE V (DRAFT PERMIT) NO. V-05-019 (REVISION 1)
GUARDIAN AUTOMOTIVE TRIM, INC.
MOREHEAD, KY.
5/15/2008
D. BRIAN BALLARD, P.E. REVIEWER
PLANT I.D. #: 021-205-00042
A.I. #: 3866
ACTIVITY ID #: APE20070002

V-05-019 REVISION 1:
Permit V-05-019 required the submittal of an air dispersion model protocol for potentially hazardous matter and toxic substance emissions within 60 days of the issuance of the proposed permit (Issued December 29, 2005). An air dispersion model protocol was received from Guardian Automotive by this office on February 26, 2006 and subsequently reviewed. A protocol approval letter was sent to Guardian Automotive on March 2, 2006. The Division followed up with Guardian Automotive by phone and e-mail several times inquiring on the submittal of the air dispersion modeling. A January 31, 2007 e-mail from Guardian Automotive Environmental staff proposed a submittal date of April 13, 2007, but this date was missed. In November of 2007 a review of Division files was conducted by the permit reviewer and it was discovered that Guardian Automotive had yet to submit the air dispersion modeling. The Division mailed a letter to Guardian Automotive on December 3, 2007 requesting submittal of the air dispersion modeling no later than 60 days from the date of the letter. The letter also required that Guardian Automotive complete form DEP7007V, Applicable Requirements and Compliance Activities, in regard to *40 CFR 63, Subpart PPPP, National Emission Standards for Hazardous Air Pollutants: Surface Coating of Plastic Parts and Products* (Hereafter Subpart PPPP).

The Division received the requested submittal on February 4, 2008. Additional information pertaining to the submittal was received March 14 and 21, 2008. Other additional information was received by e-mail on March 18, 20, 26 and 28 2008 and May 14, 2008.

The air dispersion modeling and toxics analysis received by the Division are in agreement with the previously approved protocol received in 2006. The U.S. Environmental Protection Agency (EPA) screening model SCREEN3 was applied to assess the worst-case impacts of each modeled Toxic Air Pollutant (TAP). A refined modeling analysis for TAPs was conducted using the U.S. EPA's ISCST3 model to assess the worst-case impacts of each TAP. The modeling identified the need for further analysis of the emissions of the following TAPs: Chromium, Chromic Acid and Hydrazine. The modeling results and subsequent risk assessment for each TAP are discussed below:

<u>Chromium</u>:
Chromium is emitted from two stacks; the stacks are the Etch Strip Scrubber Stack and Chrome Scrubber Stack. Both stacks are associated with the Chrome Plating Line and included under Emission Unit 5 (EU5) in permit V-05-019. The Etch Strip Scrubber controls emissions from four etch tanks. The Chrome Scrubber controls emissions from the chrome pre-dip and chrome plating tank.

The chrome plating tank is subject to 40 CFR 63, Subpart N – National Emission Standards for

Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks.

Guardian Automotive complies with Subpart N by using a chemical fume suppressant containing a wetting agent to maintain surface tension of the electroplating bath at or below 35 dynes/cm. The chromium emissions modeled from the plating tanks are referenced from the engineering evaluation submitted by Guardian Automotive dated September 7, 2006. ***The chromium emission rate modeled does not consider the control efficiency of the scrubbers.*** As permit V-05-019 is written, specific operating limitations for the scrubbers are included as an alternate operating scenario pending the outcome of the 401 KAR 63:020 compliance evaluation. The modeled annual impact of chromium emissions was found to exceed the Maximum Allowable Emission Level (MAEL) calculated using the Prioritized Chronic Dose-Response Value (PDRVs) for cancer risk from EPA's IRIS database. The PDRV is determined from the following equation:

$$Risk = C_{air} \cdot URE = 1 \times 10^{-6}$$

Where URE is an upper bound estimate of the excess cancer risk resulting from a lifetime of continuous exposure to an agent at a concentration of 1 µg/m^3 in air. It should be noted that unit risk estimates (UREs) are derived using the assumption that the average adult inhalation rate is 20 cubic meters per day (m^3/day) and the average adult body weight is 70 kilograms; an approach which may lead to an underestimate of risk in non-adult populations. In the equation above, risk is equal to one in a million. The MAEL for chromium using a one-in-a-million risk is 8.333 x 10^{-5} µg/m^3. The maximum concentration of chromium determined from the modeling was 2.75 x 10^{-2} µg/m^3. This value significantly exceeds the MAEL.

As a result of these findings the Division will require that the scrubbers be in operation whenever the chrome plating tank and/or etch tanks are in operation and that the permittee monitor the scrubbers' pressure differential and scrubber liquid flow rate daily. The Division will require Guardian Automotive to perform stack tests to determine the chromium emission rate from and efficiency of the chrome scrubber and etch scrubber. During the test, Guardian Automotive will be required to establish the pressure drop across each scrubber and will in turn be required to operate the scrubbers within ± 2 inches water column of the pressure drop values established during the test. The Division will require that the tests are performed within 180 days of permit issuance. The chrome scrubber and etch scrubber are each 3-stage composite mesh pad mist eliminator systems. The scrubber manufacturer estimates that 99.8 percent of chrome is eliminated from the exhaust stream after passing through the third stage of the filter system. The permittee shall use the results from the performance test in conjunction with the ISCST3 air dispersion model (or a comparable model) to determine the maximum concentration of chromium at or beyond the property boundary of the facility. If the determined concentration results in a cancer risk at or below 1 x 10^{-4}, then the affected facility shall be deemed in compliance with 401 KAR 63:020.

Chromic Acid:

Chromic acid is emitted from two stacks; the stacks are the Etch Strip Scrubber Stack and Chrome Scrubber Stack. Both stacks are associated with the Chrome Plating Line and included under Emission Unit 5 (EU5) in permit V-05-019. The Etch Strip Scrubber controls emissions from four etch tanks. The Chrome Scrubber controls emissions from the chrome pre-dip and chrome plating tank.

The modeling results for chromic acid were derived from the chromium refined modeling files by scaling the chromium impacts with the ratio of chromic acid emissions to chromium emissions. ***The***

chromic acid emission rate modeled does not consider the control efficiency of the scrubber. The modeled annual impact of chromic acid emissions was found to exceed the reference concentration based on the non-cancer PDRV for chronic health effects risks.
The reference concentration for chromic acid is 8.0×10^{-3} µg/m^3. The maximum concentration of chromic acid determined from the modeling was 5.62×10^{-2} µg/m^3. The resulting hazard quotient is 7.0. The acceptable concentration can be calculated from the following equation.

$$HQ = \frac{C_{air}}{RfC} = 1.0$$

The measures described above to address chromium emissions will also address chromic acid emissions.

Hydrazine:
Hydrazine is emitted from the neutralizer tank which is associated with the chrome pre-plating line. The chrome pre-plating line is Emission Unit 4 (EU4) in permit V-05-019.Hydrazine emissions are determined by material balance. The neutralizer tank emissions are controlled by a packed bed scrubber with a demister pad. ***The hydrazine emission rate modeled does not consider the control efficiency of the scrubber.*** The modeled annual impact of hydrazine emissions was found to exceed the Maximum Allowable Emission Level (MAEL) calculated using the Prioritized Chronic Dose-Response Value (PDRVs) for cancer risk from EPA's IRIS database. For a one-in-a-million cancer risk the MAEL for hydrazine is 2.04×10^{-4} µg/m^3. The maximum concentration of hydrazine determined from the modeling was 4.50×10^{-4} µg/m^3. The scrubber manufacturer estimates the scrubber to have a 95 percent pollutant removal efficiency.

As a result of these findings the Division will require that the scrubber be in operation whenever the neutralizer tank is in operation and that the permittee monitor the scrubber pressure differential and scrubber liquid flow rate daily. It is the Division's assessment that these measures will be sufficient to assure that the cancer risk presented by hydrazine emissions will be less than one-in-ten thousand (1×10^{-4}).

The applicable operating, monitoring, recordkeeping, and reporting requirements of 40 CFR 63, Subpart PPPP have been added to the permit. The facility will be using the add-on controls compliance option to comply with Subpart PPPP. The Subpart PPPP emission limits included in the permit are for general use and thermoplastic olefin coating affected sources. The operating limits for thermal oxidizers have been updated throughout the permit so as to be consistent with Subpart PPPP requirements. The monitoring frequencies for thermocouples, permanent total enclosure velocity and pressure differential monitors and bypass dampers have been updated so as to be consistent with Subpart PPPP requirements.

SOURCE DESCRIPTION (FOR PERMIT V-05-019, ISSUED MARCH 7, 2006):
An application for a Title V permit for Guardian Automotive Trim, Incorporated was received on

May 9, 2003. The Guardian facility is a major source as defined in Kentucky State Regulation 401 KAR 51:017 (40 CFR 52.21), *Prevention of Significant Deterioration (PSD) of air quality*. The potential emissions of volatile organic compounds (VOC) are in excess of 250 tons per year. The source is located in a county classified as "attainment" or "unclassified" for ozone pursuant to Regulation 401 KAR 51:010, *Attainment Status Designations*.

Operations at the facility include spray coating of plastic parts with solvent-based coatings and decorative chrome electroplating of plastic parts. There are four paint lines at the facility. The lines are High Gloss, High Bake, Low Gloss and Resist. Permanent total enclosures (PTEs) are used to capture 100% of the volatile organic compound (VOC) emissions from the lines. There are three PTEs at the facility. There is one PTE around the High Gloss line (emission unit **02**), a second PTE around the High Bake line (emission unit **14**) and a third PTE around the Low Gloss and Resist lines (emission units **03** and **12**). The captured emissions are controlled through the use of four regenerative thermal oxidizers (RTOs). The allowable overall destruction efficiency per line for VOC is 85%. Potential to emit of VOC is calculated assuming 85% destruction efficiency. Particulate Matter (PM) emissions from the paint lines are controlled through the use of water curtains and filters.

The previous facility permits are F-96-025, S-99-050 and F-00-006. Permit F-00-006 contained emission limitations for copper, nitric acid and sulfuric acid based on regulation 401 KAR 63:022 and 63:021. 401 KAR 63:021 provides that a source with conditions based on 401 KAR 63:022 shall continue to comply with all conditions based on that regulation unless it can demonstrate that a condition is no longer necessary to protect human health and the environment. The May 2003 Title V Permit application relies on AP-42, Chapter 12.20 to estimate emissions from plating operations. The emission factors and methodologies outlined in AP-42, Chapter 12.20 contain a high degree of uncertainty and it is the Division's position that they are not adequate for the purposes of demonstrating compliance with source wide emission limitations for copper, nitric acid and sulfuric acid and are not adequate for demonstrating compliance with 401 KAR 63:020 in regard to chromium VI emissions. Permit V-05-019 has testing requirements for chromium (hexavalent), copper, nitric acid and sulfuric acid. The testing must be completed within 180 days of the issuance of permit V-05-019. An air dispersion model protocol for air toxics must be submitted within 60 days of the issuance of V-05-019. The Division approved results of these tests will be used in combination with the EPA approved air dispersion model to demonstrate compliance with 401 KAR 63:020.

As an alternative to testing, the source may submit engineering evaluations for the purpose of quantifying emissions of chromium VI, copper, nitric acid and sulfuric acid from plating operations. The source may elect to demonstrate compliance with 401 KAR 63:020 through a combination of testing and engineering evaluation. Any engineering evaluation for a specific pollutant and specific plating operation/scrubber control system must be submitted within 180 days of the issuance of the permit. The emission data from the engineering evaluation will be used in the approved air dispersion model for the purpose of demonstrating compliance with 401 KAR 63:020. If an engineering evaluation is found to be deficient or if the air dispersion model relying on data from the engineering evaluation show that the source is not in compliance with 401 KAR 63:020, the source shall be required to conduct a performance test for the pollutant evaluated according to a schedule prescribed by the Division.

COMMENTS:

The calculation methodology for potential emissions of VOC, volatile HAP and nonvolatile HAP per applicator from the paint lines is detailed below:

For Primers, Base Coats, Clear Coats, Resist Coats and Top Coats:
A x D x F_C x (1 ton/ 2000 lbs) = T
T x VOC EF x (1 – VOC CE) = lb/hour of VOC
T x PM EF x TE x (1 – PM CE) = lb/hour of PM/PM_{10}
T x vHAP EF x (1 – VOC CE) = lb/hour of vHAP
T x nvHAP EF x TE x (1- PM CE) = lb/hour of nvHAP
PTE (tons/year) = (lb/hour) x [(8760 hours) / (2000 lb/ton)]

Where,
A = The maximum applicator rate in gallons per hour.
D = The maximum coating density at the applicator in lb/Gal.[1]
F_C = The maximum fraction of an hour that coating is applied as defined below.
T = The maximum tons/hour of coating applied.
VOC EF = Volatile organic compound emission factor.[2]
PM EF = Particulate and particulate matter 10 microns or less emission factor.[3]
vHAP EF = Volatile hazardous air pollutant emission factor.[4]
nvHAP EF = Nonvolatile hazardous air pollutant emission factor.[4]
PM CE = Particulate matter and particulate matter 10 microns or less control efficiency.
TE = Transfer efficiency.
PTE = Potential to emit.
The Source Classification Code (SCC) is 40202201, Petroleum and Solvent Evaporation, Surface Coating Operations, Plastic Parts, Coating Operation. The SCC units are pounds per ton.

Cycle time for coating application = 34 seconds/cycle
Number of coating cycles per run period = 30
Runtime per run period = 1360 seconds/run period

$$F_C = Fraction\ of\ hour\ coating\ is\ applied = \frac{(34\ \text{sec}/\ cycle)(30\ cycles/\ run\ period)}{1360\ \text{sec}/\ run\ period} = 0.75$$

Note 1: The maximum coating density is specific for primer, color coats, clear coats, resist coats and top coats. The maximum coating density is based on density data for primer, base coats, clear coats, resist coats and top coats in the May 9, 2003 application.
Note 2: The average paint VOC content, specific to primer, color coat, clear coat, resist coats and top coats as specified in the May 9, 2003 application is used to calculate the VOC emission factor.
Note 3: The average paint solids content, specific to primer, color coat, resist coats and top coats as specified in the May 9, 2003 application is used to calculate the PM/PM_{10} emission factor.
Note 4: The maximum content of each individual HAP at the applicator, specific to primer, color coat, clear coat, resist coat and top coat as specified in the May, 9, 2003 application is used to calculate individual HAP emission factors.

For Purging:
A x D x [F_P + (1 – R)] x (1 ton/2000 lbs) = T
T x VOC EF x (1 – VOC CE) = lb/hour of VOC
T x vHAP EF x (1 – VOC CE) = lb/hour of vHAP
COMMENTS (CONTINUED**):**
PTE (tons/year) = (lb/hour) x [(8760 hours) / (2000 lb/ton)]
A = The maximum applicator rate in gallons per hour.
D = The purge density at the applicator in lb/Gal.
F_P = The maximum fraction of an hour that the purging occurs as defined below.

T = The maximum tons/hour of purging.
R = Recovery rate of purge (fraction of purge recovered per hour).
VOC EF = Volatile organic compound emission factor.
vHAP EF = Volatile hazardous air pollutant emission factor.
PTE = Potential to emit.
The SCC is 40202205, Petroleum and Solvent Evaporation, Surface Coating Operations, Plastic Parts, Equipment Cleanup. The SCC units are pounds per ton.

$$F_P = Fraction\,of\ hour\,purging\,occurs = \frac{(160\ \text{sec}/\ cycle)(1\ cycle/\ run\ period)}{1360\ \text{sec}/\ run\ period} = 0.12$$

$R = 45\%$

The emissions from natural gas combustion associated with the powerwash and ovens associated with the paint lines are calculated based on million standard cubic feet of natural gas burned. The emission factors for NO_X, CO and VOC are from the EPA Factor Information Retrieval (FIRE) Data System, SCC 10200603, External Combustion Boilers, Industrial, Natural Gas, less than 10 Million Btu/hr. The emission factors for PM, PM_{10} and SO_2 are from the EPA FIRE Data System, SCC 39000689, Industrial Processes, In-process Fuel Use, Natural Gas, General.

The emissions from natural gas combustion associated with boilers are calculated based on million standard cubic feet of natural gas burned. The emission factors for CO, NO_X, Lead, SO_2, and VOC are from the EPA FIRE Data System, SCC 10200603, External Combustion Boilers, Industrial, Natural Gas, less than 10 Million Btu/hr.

The emissions from the Chrome Pre-plating tanks (EU4) and Nitric Acid Strip tanks (EU8) are calculated based on the tons of make up solution required per tank. The emission factors for Copper, Particulate Matter, Nitric Acid and Sulfuric acid will be updated using the emission factor derived from the compliance test results.

The emissions from the Chrome Plating Line (EU5), Acid Copper Bath (EU6) and Nickel Plating Process (EU7) are calculated based on the 1000 Ampere hours per month used per tank. Emission factors for Chromium VI, Copper and Nickel are from the FIRE Data System and use the following SCC's: SCC 30901028, Industrial Processes, Fabricated Metal Products, Electroplating Operations, Decorative Chromium – Electroplating Tank, SCC 30901045, Industrial Processes, Fabricated Metal Products, Electroplating Operations, Copper (sulfate) – Electroplating Tank and SCC 30901068, Industrial Processes, Fabricated Metal Products, Electroplating Operations, Nickel (general) – Electroplating Tank. The emission factors for Chromium VI, Particulate Matter and Sulfuric Acid will be updated using the emission factor derived from the compliance test results.

EMISSION AND OPERATING CAPS DESCRIPTION:
401 KAR 51:017
The permittee shall demonstrate 85% overall control of VOC emissions for each of the surface coating lines to comply with BACT requirements.

EXAMPLES OF COMPLIANCE NOTIFICATION AND NOTIFICATION PROCEDURES

The permittee has developed several different examples of the operating scenarios on

each line as a means to illustrate what action would be required on the part of Guardian in reporting to the Division. Also, the examples provide insight as to how the daily calculation for compliance would be performed when the PTEs were not meeting the five-point criteria for each hour of the day. This facility is subject to the record keeping and reporting requirements in Subpart PPPP. Those requirements are not in effect at present and are not addressed in this document.

The following tables summarize events for the paint lines and paint mix rooms that would require the permittee to notify the Division of a malfunction or noncompliance situation.

As indicated earlier in Section D of the permit, Guardian is proposing to calculate capture efficiency when the five-point EPA criteria are not being met. This capture efficiency in combination with the destruction efficiency will result in the overall control efficiency.

To complete the daily compliance demonstration, Guardian is proposing to calculate the daily overall efficiency to determine compliance with the 85% limit. Some example operating scenarios and events are summarized in the following tables.

Low Gloss/Resist Lines:

Modus Pressure Differential Monitor	**Daily Compliance Demonstrated**	**Submit Report to KYDEP**
ΔP at –0.007 for all operating hours	Yes – control efficiency is 89%	Report in semi annual compliance report
ΔP 3 hour block below set point	Yes – control efficiency is above 85 %	Report in semi annual compliance report
ΔP 3 hour block below set point	No – control efficiency is below 85 %	Notify KYDEP, submit malfunction report if non compliance result of malfunction

High Gloss/High Bake Lines:

Modus Velocity Monitors	Paint Mix Room Venting to Atmosphere	Daily Compliance Demonstrated	Submit Report to KYDEP
Entrance/exit supply fan and vestibule exhaust fan achieve set point for all operating hours	No venting to atm. - 0 hrs	Yes – control efficiency is 89%	Report in semi annual compliance report
Entrance or exit supply fan or vestibule exhaust fan miss set point	No venting to atm. - 0 hrs	Yes – control efficiency is above 85%	Report in semi annual compliance report
Entrance/exit supply fan or vestibule exhaust fan miss set point	No venting to atm. - 0 hrs	No – control efficiency is 84%	Notify KYDEP, submit malfunction report to KYDEP if failure to achieve BACT result of malfunction
RTO capacity insufficient to control processes and mix rooms	Venting to atm.	Yes – control efficiency is above 85%	Submit malfunction report to KYDEP to report mix room by pass
Paint line bypass occurs and VOCs vented to atmosphere	No venting or venting occurs	Yes – control efficiency is above 85%	Submit malfunction report to KYDEP
Paint line bypass occurs and VOCs vented to atmosphere	No venting or venting occurs	No – control efficiency is below 85%	Notify KYDEP, submit malfunction report to KYDEP if failure to achieve BACT result of malfunction
RTOs operate at or above set point temperature	No venting to atmosphere	Yes – control efficiency is 89%	Report in semi annual compliance report
An RTO below set point by 28^0C for three hour block average	No venting	Yes – unit is taken off line before temperature falls below set point by 28^0C Or No – if control efficiency below 85%	Submit malfunction report to KYDEP if unit was controlling emissions from paint line at any point during 3 hour average and temperature below set point by 28^0C

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.

The Permit Statement of Basis is intended for informational purposes only and does not include any enforceable terms or condition.